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An Evaluation of Two Bread-Delivery Methods from Supplier to Retail Store

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This study is part of a research program of the Agricultural Marketing Service, U.S. Department of Agriculture, to improve the efficiency of food distribution.

Acknowledgment is made to the bread companies and the many retailers for their assistance and cooperation in this study.

September 1982

Summary

This study discusses distribution of bread from bakery to retail store. Data were obtained on costs of labor, equipment, and material for obtaining the retail order, assembling it, loading the truck, and delivering to retail outlets.

The objectives of the study were: to observe, describe, and evaluate the systems presently used for delivering bread items, and to describe alternative systems by which small inner-city retailers may continue to acquire bread items if the direct delivery to their store is no longer economically feasible.

Two systems were evaluated: the drop-delivery system and the driver-seller delivery system. In the drop-delivery system, individual customer orders are assembled at the plant warehouse and delivered to the retail store on mobile carts. This system is usually employed for supermarkets and large retail stores. In the driver-seller system, the driver uses the delivery truck as a rolling warehouse and determines customers' needs at delivery time. This system is usually employed for small retailers.

Results of the study showed that the drop-delivery system was the less costly of the two systems evaluated. The cost per loaf of bread was $0.0380 and was based on a 10-stop delivery trip, a total truckload of 2,500 loaves, a typical delivery trip of the bakery studied, and a round-trip delivery distance of 50 miles. Total labor, equipment, material, and truck cost per trip was $95.06.

The driver-seller system had a cost per loaf of $0.0530 and was based on a 25-stop delivery trip and total sales of 2.250 loaves, a typical delivery trip used by the bakery studied, and a 50-mile round-trip distance. Total labor, equipment, material, and truck cost per trip was $119.28.

Small retailers who are no longer profitable to bakery vendors for continued service find it very difficult to get the bakery items they need. One alternative system is purchase of bakery items through an independent wholesaler's cash-and-carry operation. Other alternatives could be delivery of combined purchases to one of the stores, where other retailers would pick up their part of the order, or direct purchases at the bakery. Another possible alternative would be to incorporate other vendor items with bread deliveries to help reduce per-unit delivery cost.

An Evaluation of Two Bread-Delivery Methods from Supplier to Retail Store

By Robert C. Mongelli[1]

Introduction

Commercial bread delivery started in the 19th century with door-to-door deliveries by horse and wagon. Through the years this slowly changed to delivery of a variety of bakery and other vendor items to retail food stores. After World War II the large supermarket chains emerged with their economies of scale, and often built their own bakeries and delivered bakery products to their own stores. In many instances the independent baker has been practically shut out of the major chains' bakery department sales. Consequently a major share of the baker's volume is through independent supermarkets, smaller stores, and institutional outlets. Small grocers, especially in the inner city, have found it very difficult to compete profitably with the supermarkets. Because their order size for bakery and other vendor items is relatively small and delivery costs have increased, it has become less and less economical for the individual food vendors to service these small grocers. These unprofitable accounts have caused many food vendors to stop servicing the small stores. Inner-city residents suffer because they cannot always obtain the variety of products they want and usually must pay higher prices. Some food vendors do not wish to stop servicing the small inner-city food stores, but a system must be developed to make these accounts more profitable.

Bread companies may use two different delivery systems, based on customer order size and facilities. For larger customers, such as supermarkets and large retailers, the bakery will use a drop-delivery system in which orders are placed by telephone and individual customer orders are assembled at the plant warehouse and delivered to stores on mobile carts. With smaller customers, usually small inner-city stores, the bakery will use a driver-seller delivery system in which the driver uses the truck as a rolling warehouse and determines customer needs at time of delivery.

These two delivery systems offer advantages and disadvantages to the bakery and the retailer.

Advantages to the bakery of the driver-seller system are:

- Company employees are not needed to make or receive telephone calls to write customer orders.
- Since the truck is not loaded based on customer orders, the driver can carry additional items that the retailer may request at delivery time.

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- Driver may be able to sell more bread per stop. The more sold, the more the driver earns.

Disadvantages to the bakery of the driver-seller system are:

- Driver must spend time at each stop to determine retailer needs.
- Driver must spend time at the store straightening and stocking the display case.
- Driver must drive to a delivery stop in order to determine if a customer needs products.

Advantages to the bakery of the drop-delivery system are:

- Products in the truck are handled less, which gives better quality control.
- Driver spends less time at a delivery stop. Orders for each stop already have been prepared, and the driver does not have to determine retailer needs and write the order.
- Driver will not go to a retailer where there will be a "no sale."
- Driver does not have to estimate needs and write the order for next-day delivery.
- Since driver spends less time at each stop, more stores can be serviced in an 8-hour workday.
- Order deliveries are more accurate.

Disadvantages to the bakery of the drop-delivery system are:

- Employees must be trained to answer or make telephone calls and prepare orders.
- The bakery has to train customers how to anticipate product needs.
- Retailers may not telephone orders on time, or plant personnel may not be able to reach customers by telephone to obtain their orders.

Advantages to the retailer of the driver-seller system are:

- Retailers will not have to train personnel to determine their product needs or spend time straightening display cases.
- Retailers may be able to increase their order size when delivery is made because the items on the truck are not assigned to a particular customer.
- Driver straightens and stocks the display case.

Disadvantage to the retailer of the driver-seller system is:

- A retailer may not be able to get a particular bread item that is needed if the product was sold prior to arrival.

Advantages to the retailer of the drop-delivery system are:

- Products are handled less, resulting in less damage.
- Retailers get a lower price per item because they perform many of the functions done by the driver in the driver-seller system.

Disadvantages to the retailer of the drop-delivery system are:

- Retailers cannot add to their order at delivery time.
- Retailers must have training in anticipating product needs.
- Retailers must remember to place orders.
- Retailers must find space to store the mobile cart and stock their display case.

The main purpose of this study was to evaluate two bread-delivery systems to determine direct labor, equipment, and material costs. This information would be helpful to bakeries that are trying to hold down delivery costs and maintain a ready supply of products to their customers.

Methodology

This study was conducted at a bread company using the drop-delivery and driver-seller delivery systems for local delivery of bread products to urban and suburban customers. Limited studies were conducted at other bread companies to determine whether these companies employed better delivery practices than those used by the primary company studied. Labor cost was furnished by the bakery, while equipment and material costs were furnished by equipment suppliers.

In addition to conducting in-plant studies of order-assembly and delivery-truck loading, the researcher accompanied drivers on eight delivery trips. The researcher recorded the methods used and time required in hundredths of minutes to perform the various tasks associated with each system.

In comparing the two delivery systems to determine the cost to deliver bread, certain assumptions were made based on actual experiences of the company where studies were conducted:

1. **Truck load** is 2,500 loaves on 18 mobile carts with the drop-delivery system; and 2,400 loaves loaded and 2,250 sold with the driver-seller system (returns averaged 6 percent in the company studied). Costs per loaf are based on the 2,250 loaves of bread sold. During the study it was found that load size ranged from approximately 2,000 to 3,000 loaves for the drop-delivery system, and from 2,200 to approximately 2,400 for the driver-seller system.
2. **Delivery trip** is 10 stops for the drop-delivery system and 25 stops for the driver-seller system. During the study period, drop-delivery ranged from 6 to 14 stops per trip, and driver-seller ranged from 21 to 27 stops per trip.
3. **Order size** per stop is 250 loaves for the drop-delivery system and 90 loaves for the driver-seller system. Not all the loaves that were loaded on the driver-seller trucks were sold. For drop-delivery, order size ranged from under 100 loaves to over 500 loaves per stop, and for driver-seller, order size varied from under 20 to over 130 loaves per stop.
4. **Delivery truck** is a 22-foot straight truck for drop-delivery, and a 30-foot straight truck for driver-seller.
5. Collapsible two-wheel delivery **carts** capable of holding 10 trays of bread are used to transport product from truck into the store with the driver-seller system.
6. Eighteen mobile **carts** are used to transport product from truck into store with the drop-delivery system.
7. **Round-trip distance** between truck and store is assumed to be 150 feet for both systems.
8. **Round-trip delivery distance** for both systems is assumed to be 50 miles.
9. **Direct labor:** for the purpose of this study, only direct labor involved in the systems was considered.

Some of the data collected for this study were supplemented with data obtained in previous studies.[2]

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[2] Mongelli, Robert C. "Improving Vending Deliveries to Retail and Institutional Food Outlets." ARS-NE-48, 1974, and "Selecting Labor Requirements and Costs of Two Ice Cream Delivery Systems." ARS-NE-99, 1978.

Description of Systems

The bakery studied did not have sufficient room at its inner-city facility to assemble orders and load delivery trucks for all retail distribution. Therefore, the bread was placed on mobile carts and loaded on 40-foot trailers (fig. 1) and delivered to the distribution warehouse outside the city. At the warehouse the mobile carts were removed from the trailer by an unloading crew. Based on their contents, the bread carts were positioned in different parts of the storage area warehouse (fig. 2). After the trailer was unloaded, carts with empty trays (fig. 3) from previous bakery deliveries were reloaded on the trailer for the return trip to the bakery.

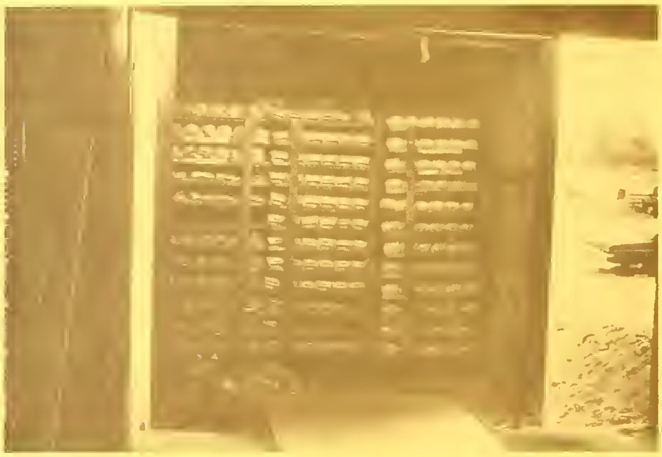

Figure 1.—Trailerload of bread before unloading at the warehouse.

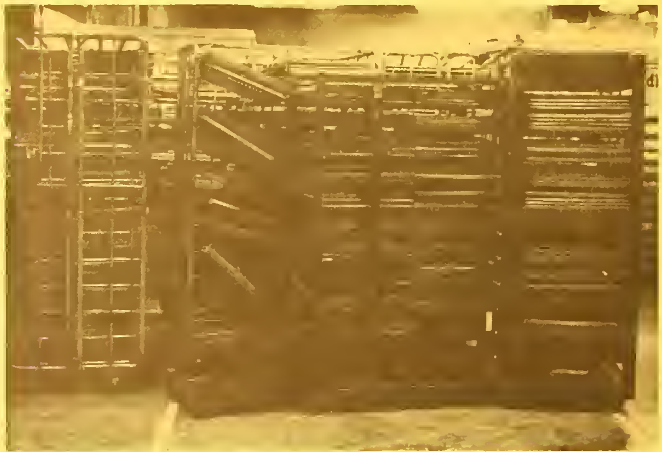

Figure 3.—Carts with empty trays before loading into trailer for return trip to bakery.

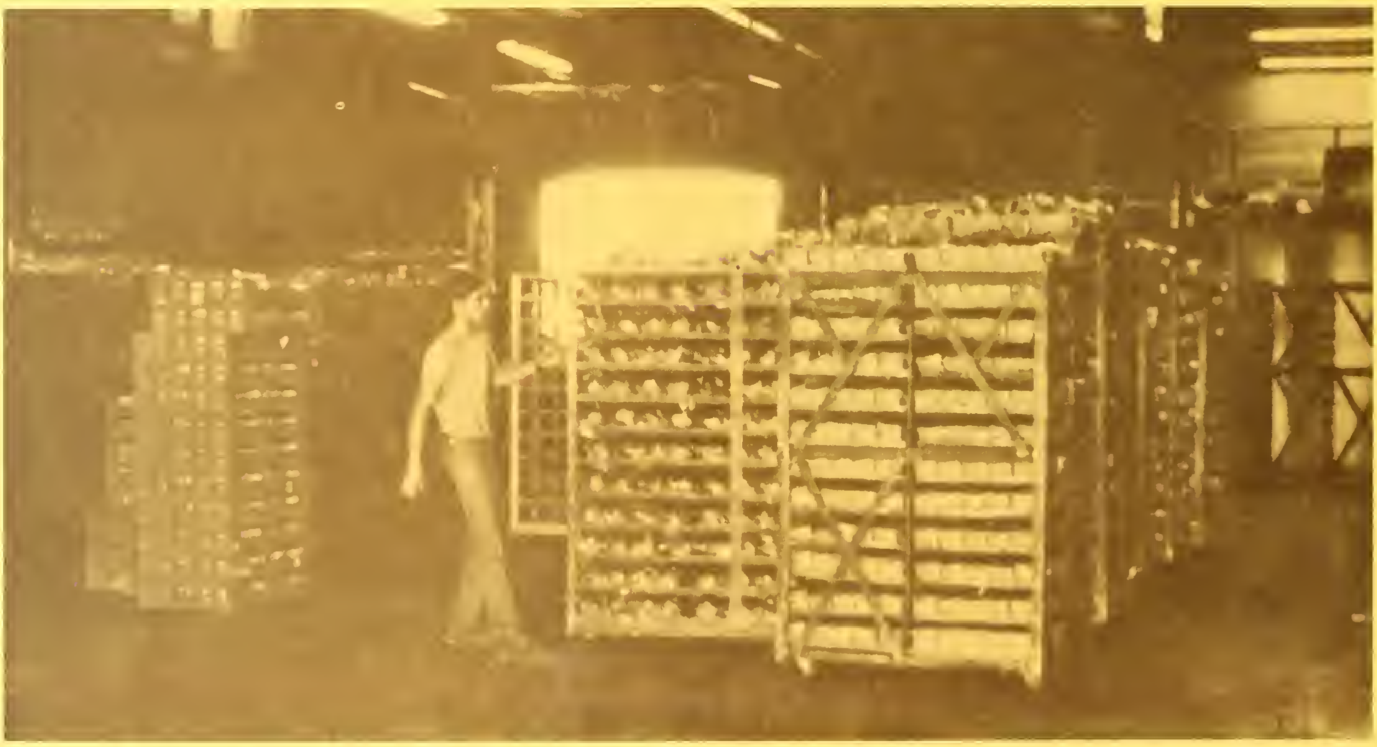

Figure 2.—Bread carts being positioned in the warehouse storage area.

In the drop-delivery system, a company employee at the distribution warehouse telephones customers to determine their bakery order. After the calls are completed, the employee prepares an order sheet for each delivery trip showing the number and variety of items for each customer. Each customer gets five deliveries per week.

Orders are assembled the afternoon before the scheduled delivery. Empty mobile carts representing each delivery stop are arranged in the order-assembling and loading area. An order sheet for each stop is placed on the cart (fig. 4). As the order assembler moves to a cart, he or she checks the first item and quantity needed on the sheet, gets a cart of that item from the storage area, moves to the customer's cart, and fills the order (fig. 5). The assembler places all of the customers' orders for that item on customer-assigned carts before starting the same process for the next item on the order sheet.

Trucks are usually loaded in the early morning of the day of delivery, with the driver loading the truck. The first customer's cart or carts loaded are the last removed and the last carts loaded are the first removed.

After the truck is loaded the driver begins deliveries. At each stop the driver removes the cart or carts needed from the truck—using a power-operated liftgate (fig. 6) at stores without truckbed-level docks—and transports the carts into the store. Store personnel check the order and either unload the cart, if time permits, or move it into the storeroom. The driver transports empty carts from the previous delivery and secures them in the truck by a brace bar.

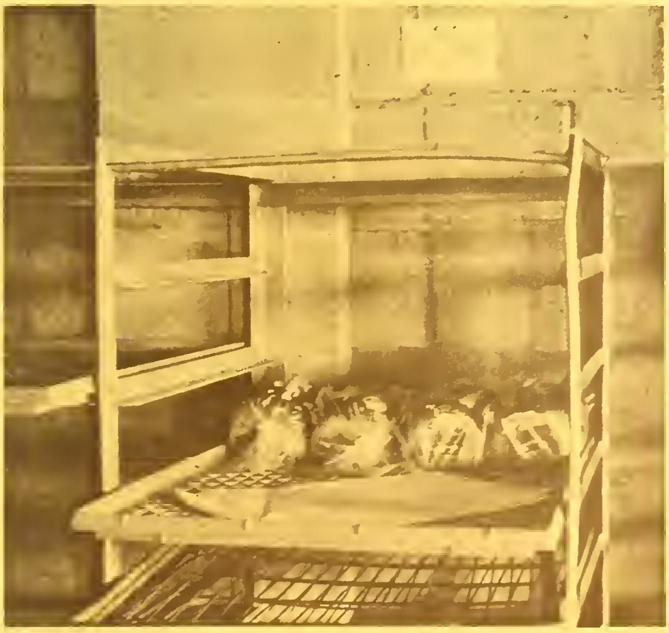

Figure 4.—An order sheet for each customer is placed on the cart.

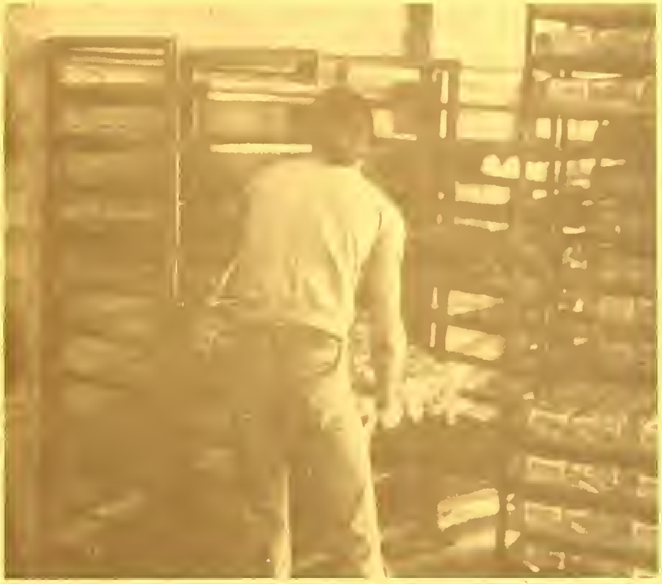

Figure 5.—An order assembler filling an order.

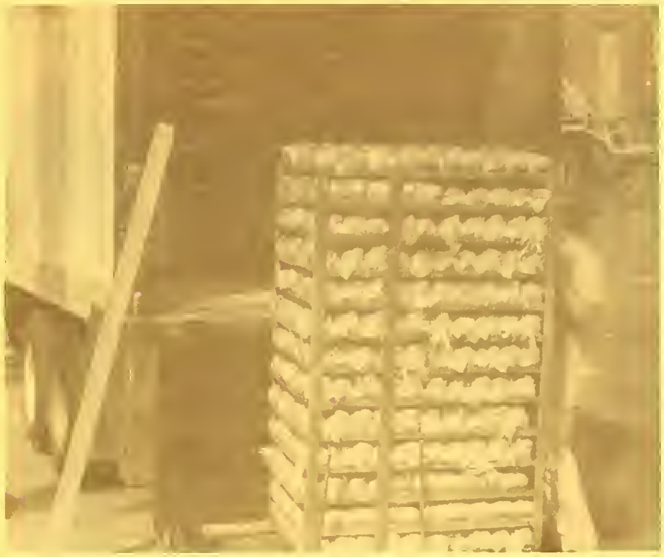

Figure 6.—Driver unloading a cart during delivery.

With the driver-seller system, the driver prepares an order showing the anticipated bread needs for the next delivery trip. The order is assembled by a member of the loading crew by obtaining a cartload of the first item needed from storage and placing the required number or trays of product in the truck. A tray consists of 10 loaves of bread, and the typical truck in this study carried 240 trays. This procedure is followed for each item listed on the order. Frequently, the loader needs more than one storage cart for a particular item. Partially filled carts are returned to the storage area before another cart with the next item needed is moved to the truck.

During truck loading, certain items are placed in designated areas of the truck (fig. 7). This procedure makes it easier for drivers to locate items during delivery. Loaders will leave space in the truck for the drivers to place returns (out-of-code product). Loading is usually performed the afternoon before the scheduled delivery trip. Customers are served three to four times per week.

At each delivery stop, the driver enters the store, determines shelf needs, removes out-of-date merchandise, writes the order, and returns to the truck. At the truck, the driver removes a collapsible two-wheel delivery cart from the rear of the truck, opens it (fig. 8), and places trays of bread on it. The driver returns to the store, has store personnel verify the order count, and stocks the shelves. Out-of-code items are checked by the store for credit before being taken to the truck. At the warehouse, much out-of-code bread is made into croutons or sold to contract buyers.

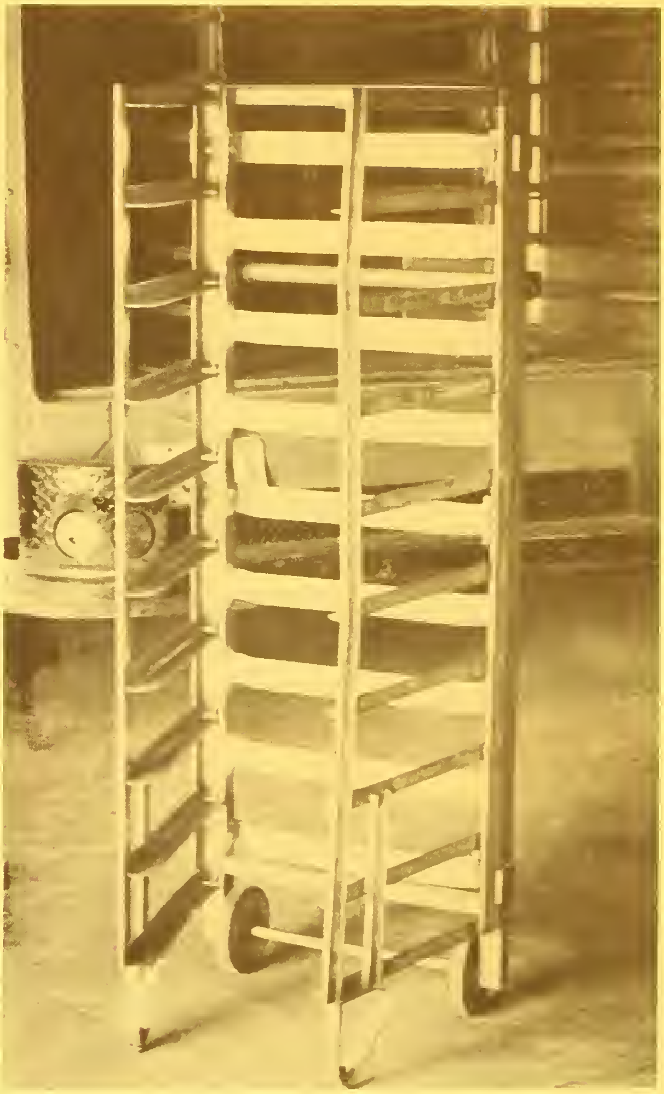

Figure 8.—Opened collapsible, two-wheel, delivery cart.

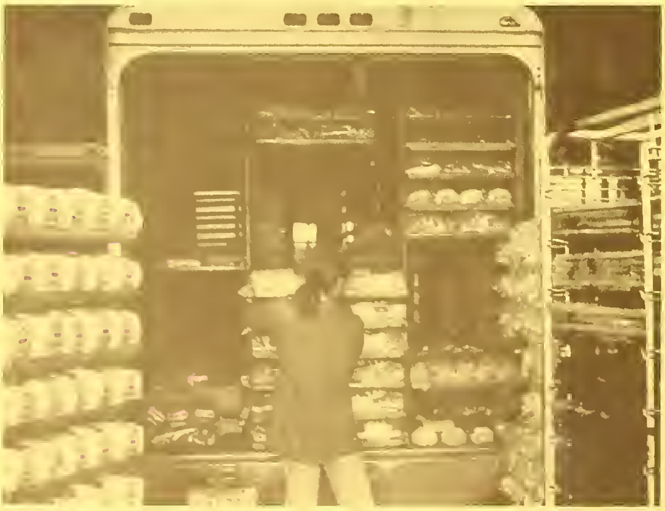

Figure 7.—Loading a driver-seller truck.

Costs for each system, including labor, equipment, and material (trays), were measured as they relate to obtaining the store order, assembling the order, and loading the truck. The costs for each system differ slightly at the warehouse. With the drop-delivery system, an office employee makes telephone calls to retailers throughout the day. After the calls have been completed, the employee prepares an order for the delivery trip. The order is used by warehouse employees in assembling individual store orders on mobile carts.

With the driver-seller delivery system, the driver determines delivery needs and writes the order. This order is given to warehouse employees who assemble and load the truck.

Table 1 shows the labor costs for determining and preparing the total truck order for the two systems: $5.08 for the drop-delivery system and $5.78 for the driver-seller system.

Order-assembly and truck-loading labor requirements and costs for the drop-delivery system are shown in table 2. Costs are shown for assembling and loading 2,500 loaves for a 10-stop delivery: $6.43, including $4.31 for assembly and $2.12 for loading.

Table 1.—Labor time and cost to determine order and prepare order sheet at the warehouse office for the drop-delivery and driver-seller systems[1]

Office activity	Drop-delivery system[2]	Driver-seller system[2]
	Worker-hours	
Telephone customers	0.44	--
Prepare order sheet	.69	0.89
	Dollars	
Total cost	[3]5.08	[4]5.78

[1] Based on 10-stop trip for the drop-delivery system and 25 stops for the driver-seller system.
[2] Total order size of 2,500 and 2,400 loaves for the drop-delivery and driver-seller systems, respectively.
[3] Based on $4.50 per hour for office employees.
[4] Based on $6.50 per hour for truck drivers.

Table 2.—Costs for order assembly and truck loading for the drop-delivery system[1]

Plant activity	Labor	
	Worker-hours	*Dollars*
Check order for quantity for each stop (10 stops per trip × 20 items per stop = 200)	0.302	[2]1.81
Place items[3] from storage cart to drop-stop cart (10 stops per trip × 20 items per stop = 200)	.255	[2]1.53
Move storage cart to next slot (20 carts × 10 stops = 200)	.053	[2].32
Obtain next cart and transport 40 ft to first drop slot (20 carts)	.109	[2].65
Subtotal	.719	4.31
Prepare truck for loading	.035	[4].22
Transport loaded cart into truck from storage area and return to storage area × 18 carts (100 ft round trip)	.292	[4]1.90
Subtotal	.327	4.12
Total	1.046	6.43

[1] Based on 2,500 loaves of bread per trip.
[2] Based on $6.00 per hour for warehouse personnel.
[3] Usually a tray, but can be individual loaves of bread.
[4] Based on $6.50 per hour for truck driver.

Equipment requirement and cost to assemble the drop-delivery order was $0.39 (18 mobile carts × $0.0305 per hour for 0.719 hour). The 18 carts each held 26 trays for a total of 468 trays. Tray cost was $0.08 (468 trays × $0.0005 per hour × ½ of 0.719 hour).

Equipment requirement and cost to load the truck was $0.18 (18 mobile carts × $0.0305 per hour for 0.327 hour). The drop-delivery truck held 468 trays and this cost $0.08 (468 trays × $0.0005 per hour × 0.327 hour). Therefore, total labor, equipment, and material costs to assemble the order and load the truck was $7.16.

Bread items for the driver-seller trucks were transported from the storage area and loaded directly into the truck by warehouse personnel. There was no order assembly prior to truck loading. Table 3 shows the labor and equipment time and costs to load 2,400 loaves (240 trays) in the truck. Total labor cost to load the truck was $3.74.

Equipment requirement and cost to load the driver-seller truck was $0.02. The truck was loaded with 240 trays and this cost $0.04 (240 trays × $0.0005 per hour × ½ of 0.624 hour). Therefore, total cost to load the truck was $3.80, including $3.74 for labor, $0.02 for equipment, and $0.04 for materials (trays).

Order assembly and loading costs were less for the driver-seller system, $0.0015 per loaf, when compared with the drop-delivery system, $0.0025 per loaf. With the driver-seller system, the trucks are loaded on the basis of total trip requirement, but each order must be assembled on carts with the drop-delivery system.

Table 3.—Cost for order assembly and loading driver-seller trucks,[1] 25 stops, 20 items per stop

Plant activity	Labor		Equipment		Total cost
	Worker-hours	*Dollars*[2]	*Worker-hours*	*Dollars*[3]	*Dollars*
Transport full cart from storage to truck (75 ft one way) × 20 trips (20 items).	0.130	0.78	0.130	0.004	0.79
Read sheet at truck to determine amount of item needed and mark sheet × 20 items.	.057	.34	.057	.002	.34
Load truck from carts, transferring trays from carts to truck—240 trays (full load).	.327	1.96	.327	.010	1.97
Return cart to storage × 20 carts (75 ft one way).	.110	.66	.110	.003	.66
Total	.624	3.74	.624	.019	3.76

[1] Based on 2,400 loaves of bread.
[2] Based on $6.00 per hour for warehouse employees.
[3] Based on $0.0305 per hour for mobile carts.

With the drop-delivery system, the driver transports a loaded mobile cart or carts from the truck into the store. The driver collects any empty carts and out-of-code merchandise from the previous delivery and returns them to the truck. Store personnel stock the sales shelves from carts.

With the driver-seller delivery, the driver must go into the store to determine quantities of bread needed. In the store, the driver straightens loaves of bread in the display case, removes out-of-code bread, determines items needed, writes the order, and returns to the truck to fill the order. The driver loads the order onto the collapsible, two-wheel, delivery cart; transports it into the store; and stocks the display case. In both systems the driver must wait while a store employee verifies quantities of bread stacked and removed from display.

With the drop-delivery system, the driver does not stock shelves. Expensive delivery equipment does not stand idle as would be the case if drivers stocked shelves. Store personnel perform this operation and the cost is borne by the retail store.

The driver-seller usually returns with approximately 6 percent (15 trays of unsold bread) of the 2,400 loaves loaded on the truck. Therefore, labor and equipment costs at the delivery stops are allocated on 2,250 loaves sold.

Table 4 shows the labor time and cost at delivery stops with the two systems. Total labor costs at delivery stops for the two systems were $24.89 for the drop-delivery system and $46.08 for the driver-seller delivery system. The labor cost per loaf sold showed that the drop-delivery system ($0.0099 per loaf) had a much lower cost than the driver-seller system ($0.0204 per loaf).

The drop-delivery system is much more efficient at delivery stops. Based on data obtained in the study, the drop-delivery system could deliver 652.2 loaves per hour compared to 317.4 loaves per hour for the driver-seller system. However, it must be noted that with the drop-delivery system, the shelves are not stacked.

Table 5 shows the equipment and material time and cost at the retail store with the two systems. Equipment and material cost for the drop-delivery system was $2.99 and for the driver-seller system was $0.89. Use of mobile carts for the drop-delivery system was the single largest equipment cost factor at the delivery stops.

Table 4.—Labor time and cost for specified activities at the retail store for two delivery systems[1]

Delivery-stop activity	Drop-delivery system[2]		Driver-seller system[2]	
	Worker-hours	*Dollars*	*Worker-hours*	*Dollars*
Travel from truck to display, straighten loaves, remove out-of-code bread, determine order, write order, return to truck	N.A.	N.A.	2.99	19.43
Assemble order at truck	N.A.	N.A.	[3]1.78	11.57
Walk from truck to store, check order in, put order away[4], return to truck	[5]3.83	24.89	2.32	15.08
Total	3.83	24.89	7.09	46.08

N.A. = Not applicable.

[1] Based on round trip of 150 feet between truck and store and $6.50 per hour for driver.

[2] Based on 10-stop trip and 25-stop trip for the drop-delivery and driver-seller delivery ststems, respectively.

[3] Time required to total amount on order sheet is included.

[4] Not required for the drop-delivery driver.

[5] Time required to transport loaded carts into the store, return out-of-code bread and empty carts to truck, and secure in trucks is included.

Table 5.—Equipment and material costs for two delivery systems during delivery trip

Equipment and Materials	Drop-delivery system		Driver-seller system	
	Hours	*Dollars*	*Hours*	*Dollars*
Mobile carts[1]	3.83	2.10	N.A.	N.A.
Collapsible two-wheel delivery cart	N.A.	N.A.	7.09	.06
Trays[2]	3.83	.89	7.09	.84
Total	N.A.	2.99	N.A.	.90

N.A. = Not applicable.

[1] Based on 18 mobile carts at $0.0305 per hour each.

[2] Based on 468 and 240 trays used by the drop-delivery and driver-seller delivery systems, respectively, at $0.0091 per hour each.

Transportation Costs

Transportation costs are based on vehicle costs and travel time assuming a 50-mile round-trip delivery. For the drop-delivery truck, a fixed cost of $2.31 (see table 6) per hour for 5.20 hours (delivery time plus travel time) results in a fixed cost of $12.01 per trip. Operating cost was $0.66 per mile, or $33. Total ownership and operating cost for the delivery trip was $45.01 or $0.0180 per loaf delivered.

For the driver-seller vehicle a 50-mile round trip also is assumed for delivery. With a fixed cost of $2.18 (see table 6) per hour for 8.71 hours (delivery time plus travel time), the fixed cost totals $18.99. Operating cost was $0.66 per mile or $33. Total ownership and operating cost for the delivery trip was $51.99 or $0.0232 per loaf delivered.

Table 6.—Development of hourly ownership and operating costs for equipment and material inputs for handling systems for fresh bread

Type of equipment and material	Initial cost per unit	Years of depreciation[1]	Annual ownership costs costs				Annual operating costs	Total ownership and operating	
			Depreciation	Interest[2]	Insurance and taxes at 4%	Total	Maintainance[3] and total	Yearly	Hourly[4]
	Dollars	*Number*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Mobile cart	200	5	40.00	10.00	8.00	58.00	3.00	61.00	0.0305
Dock plate	50	7	7.14	2.50	2.00	11.64	.75	12.39	.0061
Collapsible two-wheel delivery cart	60	5	12.00	3.00	2.40	17.40	.90	18.30	.0091
Trays	5	10	.50	.25	.20	.95	.07	1.02	.0005
Delivery truck (drop-delivery)	18,000	6	3,000.00	900.00	720.00	4,620.00	.66/mile	4,620.00	2.31
Delivery truck (driver-seller)	17,000	6	2,833.33	850.00	680.00	4,363.33	.66/mile	4,363.33	2.18

[1] Straight-line depreciation.

[2] Computed interest is 10 percent for one-half the equipment life prorated over the full life.

[3] Maintenance of 1.5 percent of cost.

[4] Based on 2,000 hours of operational use per year.

Travel time was 1.37 hours for the drop-delivery system and 1.62 hours for the driver-seller system. As shown in table 7, labor, equipment, and materials cost for the drop-delivery system was $9.93, including $8.90 for labor, $0.75 for equipment and $0.28 for materials; and $10.73 for the driver-seller system, including $10.53 for labor, $0.01 for equipment, and $0.19 for materials.

Table 7.—Total labor, equipment, material, and truck cost for the two delivery ststems

Cost	Drop-delivery	Driver-seller
	Dollars	*Dollars*
Determine order:		
Labor	5.08	5.78
Order assembly:[1]		
Labor	4.31	N.A.
Equipment	.39	N.A.
Materials	.08	N.A.
Load truck:		
Labor	2.12	3.74
Equipment	.18	.02
Materials	.08	.04
Delivery stop:		
Labor	24.89	46.08
Equipment	2.10	.06
Materials	.89	.84
Travel time[2]:		
Labor	8.90	10.53
Equipment	.75	.01
Materials	.28	.19
Delivery truck	45.01	51.99
Total cost	95.06	119.28
Cost per loaf[3]	.0380	.0530

N.A. = Not applicable.

[1] Based on 2,500 and 2,400 loaves for drop-delivery and driver-seller delivery systems, respectively.

[2] Travel time was 1.37 and 1.62 hours for the drop-delivery and driver-seller delivery systems, respectively. Labor, equipment, and material costs were calculated from these figures.

[3] Based on 2,500 and 2,250 loaves of bread sold for drop-delivery and driver-seller delivery systems, respectively.

Table 7 shows the total labor, equipment, and material costs per trip for the two delivery systems. Total cost was $95.06 or $0.0380 per loaf delivered for the drop-delivery system (10 stops per trip), and $119.28 or $0.0530 per loaf delivered for the driver-seller system (25 stops per trip). For both systems, labor cost at the delivery stop and truck cost were the two major cost items, accounting for 73 percent of the total cost of the drop-delivery system and 82 percent of the total cost of the driver-seller system.

The labor cost to obtain the order was $5.08 for the drop-delivery system and $5.78 for the driver-seller system. In the warehouse, labor, equipment, and material costs were less for the driver-seller system than for the drop-delivery system. Order assembly and truck loading ($7.16), two individual activities of the drop-delivery system, required more time and cost than the loading activity of the driver-seller system ($3.80).

More time is spent at the delivery stop to deliver a loaf of bread with the driver-seller system than the drop-delivery system. At the retail stop it took the drop-delivery driver 3.83 hours to deliver 2,500 loaves of bread compared to 7.09 hours for the driver-seller to deliver 2,250 loaves. The number of loaves delivered per hour was 652 for the drop-delivery system and 317 for the driver-seller system. This shows that the drop-delivery system is much more efficient than the driver-seller system at the retail store. Therefore, because the driver-seller had small orders per stop, used a slower delivery system at each stop, had more stops per trip, had a longer driving time per trip, and had higher truck cost per trip, costs per loaf were $0.0150 greater with this system than with the drop-delivery system.

The equipment and material cost for each system was a smaller cost item than labor. For the drop-delivery system, equipment, and material cost accounted for nearly 5 percent ($4.75 ÷ $95.06) of the total delivery cost, and for the driver-seller system, equipment and material cost accounted for nearly 1 percent ($1.16 ÷ $119.28). The use of mobile carts in the drop-delivery system was the main equipment-cost item.

Delivery vehicle cost made up between 43 and 47 percent of the total identified costs of the drop-delivery and driver-seller delivery systems.

Alternative Systems

Most small retailers are serviced by the more expensive driver-seller system because of their small order size and physical layout. Therefore, the small retailer has two disadvantages. Because the order is small, it is more expensive for the vendor on a per-loaf basis, to deliver, and small stores are usually serviced by the driver-seller system, the more expensive system. Because of the high delivery costs, many small retailers are being eliminated from vendors' deliveries.

In order to continue servicing small retailers, order size per stop must be increased. A system is needed that will keep the product going to the retailer that is not too costly to the vendor or prohibitively expensive to the retailer.

One way the retailer's order could be increased is by consolidating more than one product with the order. It may not be feasible for the retailer to increase the size of the bread order, but if other vendor items could be included with the order, the total order would be increased and it might be profitable for the vendor to deliver the order. In a recent survey[3] of convenience stores in Georgia, 92 percent of the retailers responding forecast consolidating deliveries as a result of increased distribution cost.

This survey points out an advantage of consolidated delivery to the vendor. If small retailers are to be discontinued from delivery for economic reasons, the vendor's production will decrease if other customers are not added. To avoid decreased production, consolidating deliveries with other vendors' products to make a more ecomomic delivery may be an answer.

But there are disadvantages to vendor consolidation. The average vendor may not wish to consolidate the product with other vendors' products because product control during delivery and in retail display would be lost. Drivers from other vending companies may not try as hard to sell or adequately service other products that they deliver. Without product control, vendors may not be too enthusiastic about a consolidated delivery of products.

If the retailer cannot be serviced by a vendor, the product may be obtained from a food wholesaler. For years, many small, independent retailers obtained fresh produce and groceries from cash-and-carry outlets operated by wholesalers. Over the years, other intems such as frozen food and meats have been added to the cash-and-carry line. Bread and other vendor items now are being added to the cash-and carry products by some independent wholesalers, who get their merchandise directly from bakeries and other vendors. Today, some small retailers are getting bread supplies from cash-and-carry outlets.

The size of the order delivered from the bakery to the cash-and-carry wholesaler depends on the number of small retailers making bread purchases at the outlet. The advantage to the bakery of this system is that the bakery can maintain production and add a larger order to the delivery schedule. The advantage to small retailers is that they can still obtain a ready supply of bread at wholesale prices.

Small retailers use the cash-and-carry wholesalers to purchase bakery and other needed grocery items as consumers shop at retail stores. Retailers usually push a four-wheel cart through the aisles and obtain needed items. When all items are obtained they pay for the order, load their car or truck, and return to the store.

If a cash-and-carry wholesaler is not available to supply the bread items that small retailers need, retailers may have to combine their orders into a large order delivered to one of their stores. The order may be delivered to a store that would temporarily hold it and other retailers would come by and pick up their part of the order. If this arrangement is not practical, retailers may have to go to a bakery (if this is permitted by the bakery) or even a large retail food store to get their bread.

The cash-and-carry operation and the other alternatives discussed above can help small food retailers obtain bread needs if bread delivery is stopped. An order-cutoff size is a decision that the vendor makes and when the decision goes against the retailer, it is necessary to find a new supply source.

More research is needed to determine the feasibility of combining vendor deliveries to reduce delivery costs.

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[3] Treib, Si. Presentation to the GACS annual meeting, Savannah, Ga., Sept. 10-12, 1980. Based on a survey by the Georgia Cooperative Extension Service and the Georgia Association of Convenience Stores.

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